

Marshall Space Flight Center: Lunar Regolith Terrain (LRT)

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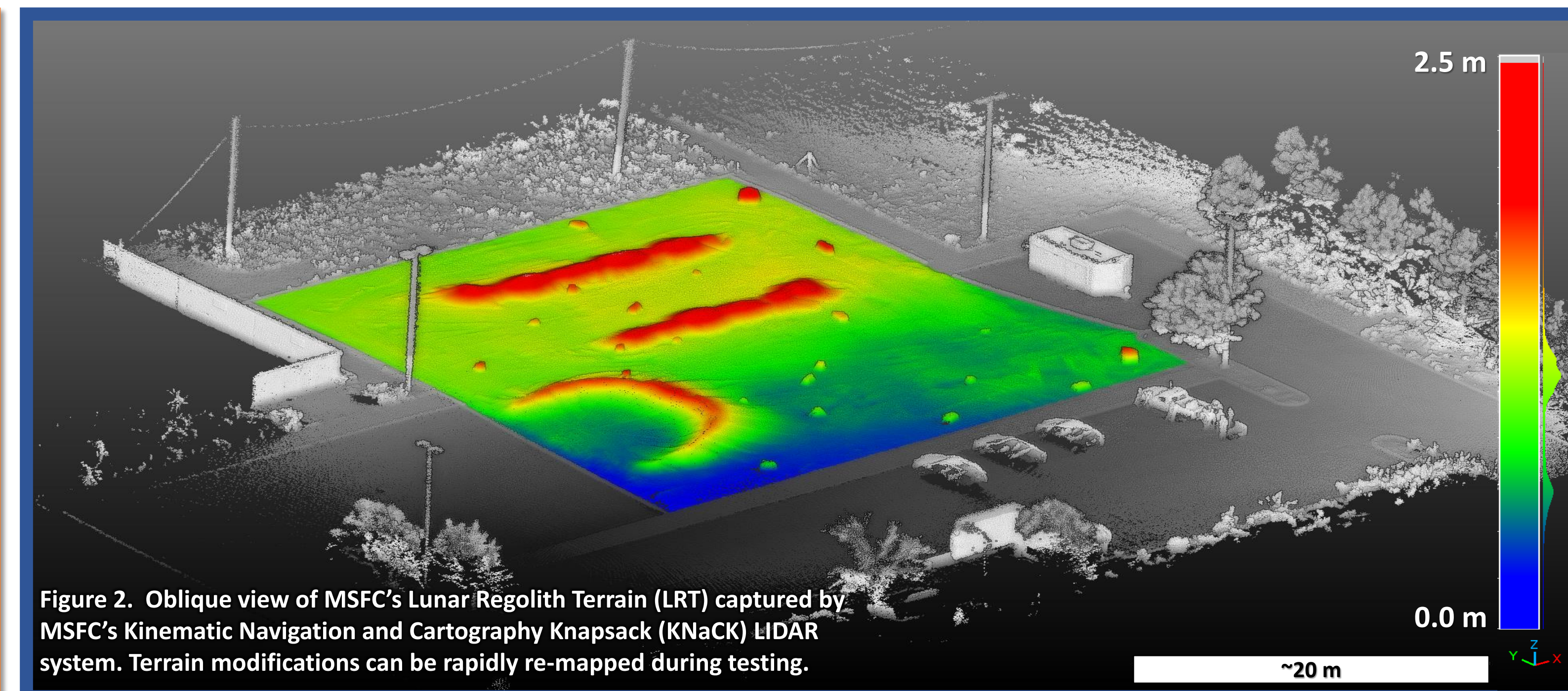


Figure 2. Oblique view of MSFC's Lunar Regolith Terrain (LRT) captured by MSFC's Kinematic Navigation and Cartography Knapsack (KNaCK) LIDAR system. Terrain modifications can be rapidly re-mapped during testing.



Figure 3. Removable Full-size Pallet Lander Mockup for rover deployment

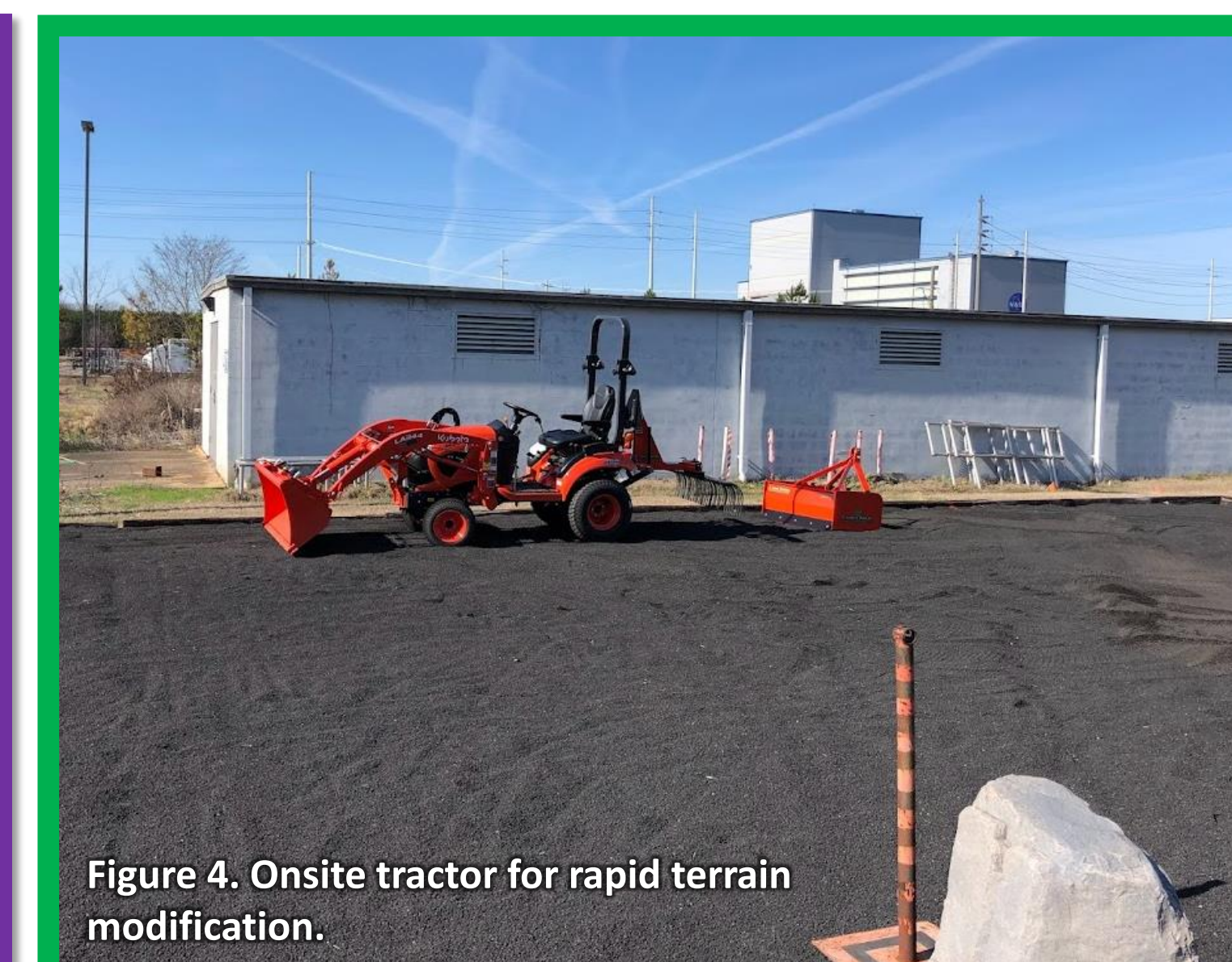


Figure 4. Onsite tractor for rapid terrain modification.

Lunar Regolith Terrain (LRT) Description:

The Lunar Regolith Terrain field is an outdoor planetary analog environment facility located on base at MSFC:

- Applies a lunar regolith simulant of JSC-1A feedstock material (volcanic cinder sand sourced from Meriam Crater, Flagstaff, AZ) with representative geotechnical, geochemical, and optical properties of lunar mare basalt.
- Contains 500 tons of lunar regolith simulant confined within a 125 ft x 125 ft (38 m x 38 m) area with a depth range between ~5 in - ~4 ft (~13 cm – 1.2m) that can be modified to suit user needs.

Current Features of the LRT:

The LRT was designed to allow rapid modification of the terrain's topography obstacles in the field:

- The terrain can be reshaped to suite specific testing requirements that may require flat-expanses, steep hills, or heavily cratered and rocky landscapes.
- Large rocky obstacles in Fig. 1 are artificial landscape boulders (faux-rocks) that can be easily placed by users or removed entirely.
- Rapid modification capabilities for burial of additional user-specific materials to enable in-situ resource utilization detection (e.g., burial of hydrogen sources for neutron detection or other materials).

Upcoming Features of the LRT:

Development of the LRT's capabilities continues with:

- Direct radio frequency communication with the Huntsville Operations Support Center (HOSC).

Currently Available to the Community:

- The LRTF provides an accessible planetary analog surface environment for surface mobility testing, autonomous roving operations, developing advanced navigation techniques and operations development.

Meets the needs of visiting research groups:

- Equipped with on-site office space: an air-conditioned and heated trailer with 120/240V power and lighting.
- Wi-Fi and Cellular signal coverage.
- On-site workspaces and secure equipment storage is available in adjacent buildings.
- Accessibility for on-site parking and delivery of instruments, payloads, and additional equipment.